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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/410,319	10/01/1999	ALEXEY VLADIMIROVICH TITIEVSKY	CEPH-0866	6692

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EXAMINER
CHAKRABARTI, ARUN K

ART UNIT	PAPER NUMBER
1634	17

DATE MAILED: 11/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/410,319	Titievsky et al.
Examiner	**Art Unit**
Arun Chakrabarti	1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- *Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.*
- *If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.*
- *If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.*
- *Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).*
- *Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).*

Status

1) ☒ *Responsive to communication(s) filed on Oct 25, 2002 .*

2a) ☐ *This action is* **FINAL.** 2b) ☒ *This action is non-final.*

3) ☐ *Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.*

Disposition of Claims

4) ☒ *Claim(s) 1-91 is/are pending in the application.*

4a) *Of the above, claim(s) _____ is/are withdrawn from consideration.*

5) ☐ *Claim(s) _____ is/are allowed.*

6) ☒ *Claim(s) 1-91 is/are rejected.*

7) ☐ *Claim(s) _____ is/are objected to.*

8) ☐ *Claims _____ are subject to restriction and/or election requirement.*

Application Papers

9) ☐ *The specification is objected to by the Examiner.*

10) ☐ *The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.*

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ *The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.*

If approved, corrected drawings are required in reply to this Office action.

12) ☐ *The oath or declaration is objected to by the Examiner.*

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ *Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).*

a) ☐ *All* b) ☐ *Some** c) ☐ *None of:*

1. ☐ *Certified copies of the priority documents have been received.*
2. ☐ *Certified copies of the priority documents have been received in Application No. _____ .*
3. ☐ *Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).*

**See the attached detailed Office action for a list of the certified copies not received.*

14) ☐ *Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).*

a) ☐ *The translation of the foreign language provisional application has been received.*

15) ☐ *Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.*

Attachment(s)

1) ☒ *Notice of References Cited (PTO-892)*
2) ☐ *Notice of Draftsperson's Patent Drawing Review (PTO-948)*
3) ☐ *Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____*
4) ☐ *Interview Summary (PTO-413) Paper No(s). _____*
5) ☐ *Notice of Informal Patent Application (PTO-152)*
6) ☐ *Other:*

DETAILED ACTION

Continued Examination Under 37 CAR 1.114

1. A request for continued examination under 37 CAR 1.114, including the fee set forth in 37 CAR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CAR 1.114, and the fee set forth in 37 CAR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CAR 1.114. Applicant's submission filed on October 25, 2002 has been entered.

Specification

2. Claims 1, 16, 83, and 87 have been amended. Non-elected claims 92-115 have been canceled without prejudice towards further prosecution.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CAR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-6, 16- 21, 30, 32, 39, 40 and 42 are rejected under 35 U.S.C. 103 (a) over Ibanez et al. (PCT International Application Number WO 97/18240) (May 22, 1997) in view of Jefferies et al. (U.S. Patent 5,981,194) (November 9, 1999) further in view of Baloh et al. (Proc. Natl. Acad. Sci. (USA), (1998), Vol. 95, pages 5801-5806).

Ibanez et al teach a method for identifying GDNF analogs that is an agonist of intracellular signaling effected by c-RET receptors in nervous system cells comprising (I) incubating the nervous system cells having c-RET receptors with a test compound and (ii) determining whether intracellular signaling has been effected in the cells (Claims 10, 16 and 18).

Ibanez et al teach a method wherein the nervous system cells are neuroblastoma cells (Claims 11, 17 and 19).

Ibanez et al do not teach a method for identifying an antagonist of intracellular signaling effected by c-RET receptors in nervous system cells comprising (I) incubating the nervous system cells having c-RET receptors with a test compound and (ii) determining whether intracellular signaling has been effected in the cells.

Jefferies et al teach a method for identifying a compound that is an agonist or antagonist of intracellular signaling effected by GPI-anchored receptors in nervous system cells comprising (I) incubating the nervous system cells having GPI-anchored receptors with a test compound and (ii) determining whether intracellular signaling has been effected in the cells (Column 8, lines 30-48 and Column 25, lines 38-58).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the antagonist of intracellular signaling detection of Jefferies et al. in the method of identifying compounds of Ibanez et al., since Jefferies et al. state, "Accordingly, substances may be identified which are effective in the treatment of Alzheimer's disease (Column 10, lines 56-58)." An ordinary practitioner would have been motivated to combine and substitute the antagonist of intracellular signaling detection of Jefferies et al. in the method of identifying compounds of Ibanez et al., in order to achieve the express advantages noted by Jefferies et al of an invention which supports the identification of substances effective in the treatment of Alzheimer's disease.

Ibanez et al in view of Jefferies et al. do not teach a method wherein GDNF is linked to GPI-anchored proteins.

Baloh et al. teach a method wherein GDNF is linked to GPI-anchored proteins (Abstract and RESULTS Section).

Ibanez et al in view of Jefferies et al. do not teach a method wherein the nervous system cells express GFRalpha1 receptors but not Ret receptors.

Baloh et al. teach a method wherein the nervous system cells express GFRalpha receptors but not Ret receptors. (Abstract, Introduction, last two paragraphs).

Ibanez et al in view of Jefferies et al. do not teach a method wherein the nervous system cells are DRG neurons Ret (-/-) and Ret-independent.

Baloh et al. teach a method wherein the nervous system cells are DRG neurons Ret (-/-) and Ret-independent (Discussion Section, Page 5806, Column 1, second paragraph).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the GDNF- linked to GPI-anchored proteins GFRalpha receptors wherein the nervous system cells are DRG neurons Ret (-/-) and Ret-independent of Baloh et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al., since Baloh et al. state, "Our analysis of transfected fibroblasts indicates that GFRalpha3 does not form a functional receptor complex with Ret for any of the known GF ligands. There are several possibilities to explain this result, all of which suggest the presence of additional receptor system components. We cannot exclude the possibility that known GF ligands interact with GFRalpha3 in the presence of another Ret like signaling protein. The existence of another Ret like signaling molecule has also been proposed to explain the expression of GFRalpha1 and GFRalpha2 in several structures without Ret (Page 5806, Column 1, lines 9-18)". An ordinary practitioner would have been motivated to combine and substitute the GDNF-linked to GPI-anchored proteins GFRalpha1 receptors of Baloh et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al., in order to achieve the express advantages

noted by Baloh et al of an invention which indicates that GFRalpha3 does not form a functional receptor complex with Ret for any of the known GF ligands raising several possibilities, all of which suggest the presence of additional receptor system components other than Ret signaling protein to explain the expression of GFRalpha1 and GFRalpha2 in several structures without Ret.

5. Claims 1-10, 15- 24, 29-33, 38-40, 42 , 43 and 48-58 are rejected under 35 U.S.C. 103 (a) over Ibanez et al. (PCT International Application Number WO 97/18240) (May 22, 1997)in view of Jefferies et al. (U.S. Patent 5,981,194) (November 9, 1999) further in view of Baloh et al. (Proc. Natl. Acad. Sci. (USA), (1998), Vol. 95, pages 5801-5806) further in view of Shen et al. (Journal of Immunology, (1994), Vol. 152, pages 3017-3023).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al teach methods of claims 1-6, 16- 21, 30, 32, 39, 40 and 42 as described above.

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al do not teach the method wherein the intracellular signaling is measured as an increase in intracellular Calcium concentration as compared to controls not incubated with the compound.

Shen et al teach the method wherein the intracellular signaling is measured as an increase in intracellular Calcium concentration as compared to controls not incubated with the compound. (Abstract and Figure 4 and Materials and Methods Section, Ca 2+ flux assay subsection).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al do not teach the method wherein the intracellular signaling is measured as kinase activation by (I) preparing a cell lysate, (ii) immunoprecipitating the cell lysate with an anti GPI-anchored antibody to form an

immunoprecipitate, (iii) performing an assay to measure kinase phosphorylation on the immunoprecipitate, and (iv) comparing the results with controls not incubated with the compound.

Shen et al teach the method wherein the intracellular signaling is measured as kinase activation by (I) preparing a cell lysate, (ii) immunoprecipitating the cell lysate with an anti GPI-anchored antibody to form an immunoprecipitate, (iii) performing an assay to measure kinase phosphorylation on the immunoprecipitate, and (iv) comparing the results with controls not incubated with the compound. (Abstract, Materials and Methods Section, Immunoprecipitation subsection and Figures 1-3).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al do not teach the method wherein the kinase is measured as PLCgamma activation.

Shen et al teach the method wherein the kinase is measured as PLCgamma activation. (Abstract and Figures 3 and 5)

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the intracellular signaling measurement by an increase in intracellular Calcium concentration and PLCgamma activation and Immunoprecipitation of Shen et al. in the method of identifying compounds of Ibanez et al. in view of Baloh et al , since Shen et al. state, "Activation of protein tyrosine kinase after ligand binding has been shown to be the primary event for signaling by members of the multichain immune recognition receptor family (Page 3022, column 1, lines 8-11)." An ordinary

practitioner would have been motivated to combine and substitute the intracellular signaling measurement by an increase in intracellular Calcium concentration and PLCgamma activation and Immunoprecipitation of Shen et al. in the method of identifying compounds of Ibanez et al. in view of Baloh et al, in order to improve the identification method of a compound that is an agonist or antagonist of intracellular signaling effected by GPI-anchored receptors in nervous system cells and also in order to achieve the express advantages noted by Shen et al., of a biochemical pathway i.e., activation of protein tyrosine kinase after ligand binding that has been shown to be the primary event for signaling by members of the multichain immune recognition receptor family.

6. Claims 1-10, 12- 13, 15-24, 26-27, 29-33, 35-36, 38-40, 42 , 43, 45-46, 48-58 , 68, 69, 70, 75, 76, 77, 79-82, 83-85, 87-89 and 91 are rejected under 35 U.S.C. 103 (a) over Ibanez et al. (PCT International Application Number WO 97/18240) (May 22, 1997) in view of Jefferies et al. (U.S. Patent 5,981,194) (November 9, 1999) further in view of Baloh et al. (Proc. Natl. Acad. Sci. (USA), (1998), Vol. 95, pages 5801-5806) further in view of Shen et al. (Journal of Immunology, (1994), Vol. 152, pages 3017-3023) further in view of Dikic et al. (Nature, (1996), Vol. 383, pages 547-549).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. teach methods of claims 1-10, 15- 24, 29-33, 38-40, 42 , 43 and 48-58 as described above.

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al do not teach the method wherein the kinase is Src-type kinase that is measured by activation of MAPK.

Dikic et al. teach the method wherein the kinase is Src-type kinase that is measured by activation of MAPK. (Abstract, Figure 4 and Methods Section, Kinase Assays subsection).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the Src-type kinase that is measured by activation of MAPK of Dikic et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al., since Dikic et al. state, "Src family protein tyrosine kinases, which are expressed in every cell type and tissue, appear to be a common and important component of this pathway, acting together with cell-type-specific protein tyrosine kinases, such as Pyk2 in PC12 cells or Syk in avian B cells, to bring about a cell-type-specific signal for linking G-protein coupled receptors with the MAP kinase signaling pathway and hence the transcriptional machinery (Page 549, Column 2, last sentence)." An ordinary practitioner would have been motivated to combine and substitute the Src-type kinase that is measured by activation of MAPK of Dikic et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al., in order to improve the identification method of a compound that is an agonist or antagonist of intracellular signaling effected by GPI-anchored receptors in nervous system cells and also in order to achieve the express advantages , as noted by of Dikic et al , of

the Src family protein tyrosine kinases, which are expressed in every cell type and tissue, appear to be a common and important component of this pathway, acting together with cell-type-specific protein tyrosine kinases to bring about a cell-type-specific signal for linking G-protein coupled receptors with the MAP kinase signaling pathway and hence the transcriptional machinery.

7. Claims 1-10, 12-24, 26-33, 35-40, 42 , 43, 45-58 , 68, 69, 70, 71, 75, 76, 77-82, 83-89 and 90-91 are rejected under 35 U.S.C. 103 (a) over Ibanez et al. (PCT International Application Number WO 97/18240) (May 22, 1997) in view of Jefferies et al. (U.S. Patent 5,981,194) (November 9, 1999) further in view of Baloh et al. (Proc. Natl. Acad. Sci. (USA), (1998), Vol. 95, pages 5801-5806) further in view of Shen et al. (Journal of Immunology, (1994), Vol. 152, pages 3017-3023) further in view of Dikic et al. (Nature, (1996), Vol. 383, pages 547-549) further in view of Finkbeiner et al. (Neuron, (1997), Vol. 19, pages 1031-1047).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al teach methods of claims 1-10, 12- 13, 15-24, 26-27, 29-33, 35-36, 38-40, 42 , 43, 45-46, 48-58 , 68, 69, 70, 75, 76, 77, 79-82, 83-85, 87-89 and 91 described above.

Ibanez et al. in view of Baloh et al in view of Jefferies et al. further in view of Shen et al further in view of Dikic et al do not teach the method wherein the activation of Src-type kinase is measured as activation of CREB.

Finkbeiner et al. teach the method wherein the activation of Src-type kinase is measured as activation of CREB(Abstract and Figures 2, 10 and 12).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the activation of Src-type kinase that is measured as activation of CREB of Finkbeiner et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al, since Finkbeiner et al. state, "These findings reveal a previously unrecognized, CaMK-dependent mechanism by which neutrophins activate CREB and suggest that CREB plays a central role in mediating neutrophin responses in neurons (Abstract, last sentence)." An ordinary practitioner would have been motivated to combine and substitute the activation of Src-type kinase that is measured as activation of CREB of Finkbeiner et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al, in order to improve the identification method of a compound that is an agonist or antagonist of intracellular signaling effected by GPI-anchored receptors in nervous system cells and also in order to achieve the express advantages, as noted by Finkbeiner et al., of CREB that plays a central role in mediating neutrophin responses in neurons.

8. Claims 1-91 are rejected under 35 U.S.C. 103 (a) over Ibanez et al. (PCT International Application Number WO 97/18240) (May 22, 1997) in view of Jefferies et al. (U.S. Patent 5,981,194) (November 9, 1999) further in view of Baloh et al. (Proc. Natl. Acad. Sci. (USA), (1998), Vol. 95, pages 5801-5806) further in view of Shen et al. (Journal of Immunology, (1994), Vol. 152, pages 3017-3023) further in view of Dikic et al. (Nature, (1996), Vol. 383,

pages 547-549) further in view of Finkbeiner et al. (Neuron, (1997), Vol. 19, pages 1031-1047) further in view of Chalazonitis et al. (Developmental Biology, (1998), Vol. 204, pages 385-406).

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al further in view of Finkbeiner et al. teach methods of claims 1-10, 12-24, 26-33, 35-40, 42 , 43, 45-58 , 68, 69, 70, 71, 75, 76, 77-82, and 83-91 as described above.

Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al further in view of Dikic et al further in view of Finkbeiner et al. do not teach the method wherein the antibody is anti-GFRalpha1.

Chalazonitis et al teach the method wherein the antibody is anti-GFRalpha1 (Figures 12, 15 and Materials and Methods Section, Immunocytochemistry Subsection).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the antibody assay using anti-GFRalpha1 of Chalazonitis et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al further in view of Finkbeiner et al., since Chalazonitis et al. state, "The number of GFRalpha-1 immunoreactive cells in cultures was found in the current study to be greatly increased by exposure to GDNF, an effect that could be explained by an ability of GDNF to enhance the expression of its own receptor. Alternatively, the GDNF-induced increase in GFRalpha-1 immunoreactive cells may simply reflect the enhanced development in the presence of GDNF of

neurons, which are the cells that anchor GFRalpha-1 (Page 401, column 1, last paragraph to column 2, line 8)." An ordinary practitioner would have been motivated to combine and substitute the antibody assay using anti-GFRalpha1 of Chalazonitis et al. in the method of identifying compounds of Ibanez et al. in view of Jefferies et al. further in view of Baloh et al further in view of Shen et al. further in view of Dikic et al further in view of Finkbeiner et al., in order to improve the identification method of a compound that is an agonist or antagonist of intracellular signaling effected by GPI-anchored receptors in nervous system cells and also in order to achieve the express advantages, as noted by Chalazonitis et al., of an antibody that can detect the ability of GDNF to enhance the expression of its own receptor.

Response to Amendment

9. In view of the response to amendment, all previous 103(a) rejections have been withdrawn. However, new 103(a) rejections have been included.

Response to Arguments

10. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D. whose telephone number is (703) 306-5818.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, W.Gary Jones, can be reached on (703)308-1152.

Any inquiry of general nature or relating to the status of this application should be directed to the Group analyst Chantae Dessau whose telephone number is (703) 605-1237.

Papers related to this application may be submitted to Technology Center 1600 by facsimile transmission via the P.T.O. fax Center located in Crystal Mall 1. The CM1 Fax Center numbers for Technology Center 1600 are either (703) 305-3014 or (703) 308-4242. Please note that the faxing of such papers must conform with the Notice to comply published in the Official Gazette, 1096 OG 30 (November 15, 1989).

Arun Chakrabarti,

Patent Examiner

Art Unit 1634

November 13, 2002

W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600